

**REMARKS**

A Request for Continued Examination ("RCE") has been concurrently filed herewith.

The RCE requests entry of the Amendment dated May 4, 2007 and requests the consideration of this Response under 37 C.F.R. § 1.114. Applicants submit this Response under 37 C.F.R. § 1.114 for the purpose of supplementing the remarks presented in the Amendment dated May 4, 2007.

Upon entry of the Amendment dated May 4, 2007, claims 27-32, 34, and 35 will be pending in the application.

The Office Action includes three new grounds of rejection under 35 U.S.C. § 103, as follows:

claims 27, 29-30, and 32-35 have been rejected under 35 U.S.C. § 103 as allegedly being unpatentable over U.S. Published Application No. 2004/0173908 to Barth et al. ("Barth '908") in view of U.S. Published Application No. 2003/0067077 to Lee ("Lee '077");

claim 28 has been rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Barth '908 in view of Lee '077, further in view of Applicant's admitted prior art; and

claim 31 has been rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Barth '908 in view of Lee '077, further in view of U.S. Patent No. 6,313,517 to Lauterbach *et al.*

Claim 27 presently recites an adhesive film being constituted by a silicon-based compound having an aromatic ring.

The Examiner concedes that Barth '908 is deficient in that it fails to teach an adhesive film being constituted by a silicon-based compound having an aromatic ring. For example, Barth

'908 fails to disclose that a silicon-based compound, if any at all, would include an aromatic ring. Lee '077 is relied upon to make up for this deficiency. Lee '077 teaches an organic copper diffusion barrier layer 118 that at least comprises a benzocyclo polymer, such as benzocyclobutene. *See* paragraph [0019].

Applicants respectfully submit that Lee '077 fails to make up for the deficiencies of Barth '908. A person of ordinary skill in the art would have appreciated that a benzocyclo polymer or benzocyclobutene does not necessarily contain a silicon-based compound. Lee '077 fails to describe or suggest that the benzocyclo polymer or benzocyclobutene thereof in fact contains silicon. In this regard, Lee '077 is also deficient in that it fails to describe or suggest a silicon-based compound having an aromatic ring.

Further, a person of ordinary skill in the art would not have been motivated to replace the adhesion promoter layer 118 disclosed in Barth '908 with the organic copper diffusion barrier layer 118 disclosed in Lee '077. Both Barth '908 and Lee '077 fail to teach or suggest that the organic copper diffusion layer 118 disclosed in Lee '077 can provide adhesion to a low dielectric constant film possessing a silicon-containing organic compound.

Barth '908 discloses an interconnect structure comprising in order a cap layer 117, an adhesion promoter layer 118, and an ILD layer 119. Barth '908 discloses that ILD layers 112 and 119 may be formed of any suitable dielectric material and preferably formed of low-k dielectric materials. *See* paragraph [0031]. Barth '908 discloses that any silicon-containing low-k dielectric is one of several suitable dielectric materials. *Id.* Further, Barth '908 discloses that adhesion promoter layers 111 and 118 may be composed of any material suitable for

enhancing adhesion of the dielectric material. *See* paragraph [0033]. Barth '908 discloses that if SiLK is used for ILD layers 112 and 119, adhesion promoter layers 111 and 118 may be formed of AP4000 (available from The Dow Chemical Company). SiLK contains no silicon. In this regard, Barth '908 fails to teach or suggest using the adhesion promoter thereof to provide adhesion to a cap layer and a low dielectric constant film possessing a silicon-containing organic compound.

In contrast, Figure 1I of Lee '077 shows that organic diffusion barrier layer 118 is provided between a first copper layer 116a and the second dielectric layer 120. Lee '077 fails to teach or suggest that the dielectric layer thereof contains a silicon-containing organic compound. Lee '077 also discloses that the second dielectric barrier layer 120 includes a spin-on polymer, such as FLARE, SiLK, PAE-II, Velox, etc. *See*, paragraphs [0014] and [0021]. In this regard, Lee '077 also fails to teach or suggest that the organic diffusion barrier layer 118 thereof provides adhesion to a low dielectric constant film possessing a silicon-containing organic compound. Given that Lee '077 fails to teach or suggest that the organic diffusion barrier layer 118 provides adhesion to a low dielectric constant film possessing a silicon-containing organic compound, a person of ordinary skill in the art would not have replaced the adhesion promoter layer 118 disclosed in Barth '908 with the organic copper diffusion barrier layer 118 disclosed in Lee '077.

Additionally, each of claims 28-32, 34, and 35 depends from claim 27. In this regard, claims 28-32, 34, and 35 are nonobvious for at least the same reasons as claim 27.

RESPONSE UNDER 37 C.F.R. § 1.114(c)  
U.S. Application No.: 10/646,709

Attorney Docket No.: Q76993

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

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